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WATER-BASED SETTLEMENTS AND THE URBAN PLANNING CHALLENGES IN INDONESIA A CASE STUDY OF BANJARMASIN CITY

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Abstract

The Banjarmasin city is located in territorial waters. The development is currently causing problems related to the context of the aquatic environment. This is because urban development planning is not in accordance with the environmental context. Therefore, this article aims to determine the sustainability of water-based settlements in aquatic environment in Banjarmasin city. This is a qualitative article with the descriptive method used to explain the environmental structure and architectural elements of water-based settlements. Primary and secondary data were obtained from field observations and the city government in the form of maps and pictures of settlements. The data collected were analyzed with the descriptive approach and concluded using the deductive method. This article reveals the form of residence due to community adaptation to water areas and finds that urban spatial development policies need to understand the community's adaptation process as a local brand of city identity. The concept of 'living with water' is a future challenge because it is a water-based cultural adaptation strategy. The architecture of the floating residence has the opportunity to be developed into a floating settlement and city. Therefore, the adaptation of residential architectural forms and environmental structures supports the Banjarmasin city as a waterfront city.

Keywords: Water-based; Settlements; Urban planning; Floating house; Waterfront

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INTRODUCTION

Banjarmasin city is located on the Kalimantan Island-Indonesia and is known for its water-based culture which is preserved to this day (Figure 1). This city has a density of 6,949 inhabitants/km² and is reputable for being the most populous city in South Kalimantan Province (Badan Pusat Statistik 2020). The city is located between *Barito* and the *Martapura* which are the largest rivers with widths between 650-800 meters and also surrounded by 7 medium and 94 small rivers with relatively flat slopes ranging between 0% -3%.

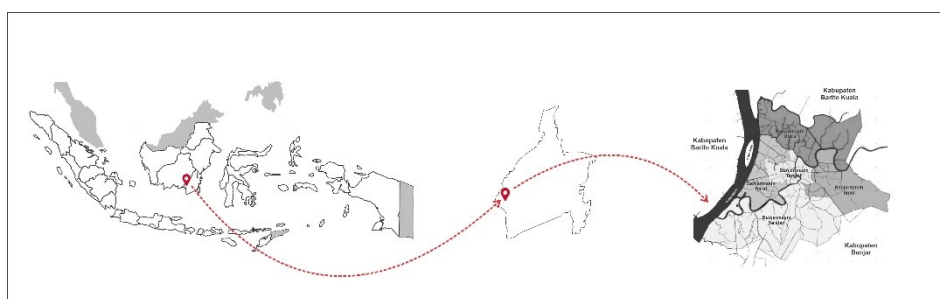


Figure 1. Location of Banjarmasin City (drawn by Yustina)

The local wisdom of the traditional community in Banjarmasin city known as the *Urang Banjar* creates adaptive creativity in the form of the water-based settlement culture and this was observed by some experts to have been around for centuries (Kusno, 2000; Subiyakto 2005). According to Muhammad and Mentayani (2007), the adaptation of people's behavior to a water-based environment existed before the establishment of the *Banjar* Kingdom. This behavioral adaptation marks the existence of a water-based settlement civilization in the Banjarmasin traditional community. Moreover, Saleh (1962) described *Urang Banjar* as "moving by hand" due to the continuous pedaling of a boat or *jukung* across the river all day long. The disconnection with nature impairs sustainability; consequently, the river's value degrades (Rohana, 2021). Waterfront development emerged as one of the important issues of urban design and planning since it provides an opportunity to improve social well-being, economic development and physical setting of a city. In recent decades, many waterfronts have experienced reorientation from brownfield to commercial, residential and recreational areas (Nurbaidura, 2018).

DESCRIPTION OF LOCATION AND PROBLEM

The Banjarmasin community has grown to adapt to the water area with the activities of the settlers observed to be usually above the water level and this forms a resilience culture to the water area conditions. This behavioral response to the environment is reflected in the habits of the population as observed in their choice of movement path and determination of shipping direction towards both the estuary

and upstream of the river as well as the process of anchoring to the mainland. The ability to build and settle on water through the concept of water-based architecture also supports the residents' resilience in their environment. It is, therefore, important to study the resilience and sustainability of water-based settlements in Banjarmasin city to serve as a form of appreciation for the water-based culture which is a local brand and heritage asset of Banjarmasin city. This study is, however, expected to be useful as a reference in planning sustainable water-based urban development. The importance of spatial planning based on the culture of living in Banjarmasin city and carrying out development for sustainability of future generations, is a new attribute added to this manuscript.

RESEARCH METHODS

This is a qualitative article with the descriptive method used to explain the environmental structure and architectural elements in water-based settlements. Primary and secondary data were collected from field observations and the city government in the form of settlement maps and pictures. The data collected were analyzed using the descriptive approach and concluded by deductive method. The qualitative method was adopted in this study to describe water-based settlements in Banjarmasin city and this was conducted through different stages as indicated in the following aspects: a) Environmental context description stage, b) Shelter and citizen activities description stage, c) Challenges of urban planning description stage

RESULT AND ANALYSIS

The environment is generally built from the order of form, place, and understanding and according to Habraken (1998), environmental structure is divided into 3 elements of order. The accommodation process is defined as the inhalation of the place while the assimilation process is explained to be the adjustments in articulating places (Schulz 1980). Rahman et al. (2017) examined how the conservation of historic waterfront areas contributes to the improvement of quality of life in Dhaka City and suggested ways to protect river banks. This is in line with the findings of Jauregui et al. (2019) that a settlement with a frontage to the canal and access to the sea is more valued than those without this access and the same was also observed with the distance of a settlement to open water. This was evident in Stevens's (2009) research that the analysis foregrounds four aspects of the artificiality of urban waterfronts: taming the landscape to provide comfort and safety, augmenting the landscape to provide varied sensory stimulation, carefully positioning the waterfront within a wider climatic, thematic, and functional context, and managing the temporal dimension of the visitor experience. There is, however, the need for the participation of local communities in waterfront planning as stated by Prilenska et al. (2020) in their research that the shortcomings of civic engagement strategies and the desired changes through a series of semi-structured

interviews with key stakeholders involved and the analysis of planning related documentation. Good waterfront planning has the ability to create urban transformation which accommodates floating settlements as described by Dal Cin et.al (2021) that the contribution of this study to scientific research is to highlight the role of public space on the waterfront, both to implement adaptation to flooding phenomena and to implement the urban transformation necessary to accommodate floating settlements. The importance of understanding the history of local culture and the diversity of local values in waterfront planning was identified by Airas et al. (2019) and this was observed in their findings that urban waterfront redevelopments have spread into smaller and suburban communities. The ecological significance of the water environment is explained by Fumagalli (2013) that the definition of a methodology for planning suburban waterfront functions as ecological and recreational. Moreover, improper handling of the water environment has been discovered to have the ability to cause damage to the environmental structure as confirmed by Woo et al. (2017) that the reclamation of land for waterfront development is closely correlated with the destruction of these natural structures. Hoyle (2002) also explained that it is important to improve the quality of the built environment in the heart of the traditional town, building in the long-established relationship between the city and the sea. This means a quality improvement effort in water environment areas is expected to improve the quality of life for the residents based on the concept proposed by Garcia et al. (2015) that the project concept is to utilize empty spaces, in all lake waterfronts, for the construction of public toilets and showers introduction of the electric boat and bike rental for sightseeing. This shows that a water-based settlement is the result of adaptation by a settled community. However, behavioral adaptations are reflected in different patterns of activities and daily life cycles, functional adaptations are indicated by the activity space zone or separation of dry land and water spaces along with their utilization, and structural adaptation is reflected in the physical-spatial arrangement of the residential environment as indicated by the aspects of layout, orientation, and residential buildings contextual to the dynamics of the water area as shown in Figure 2 and 3.

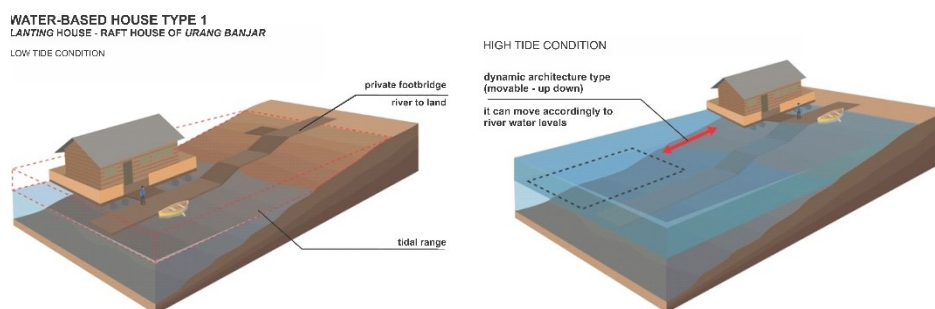


Figure 2. Space zone 1, water spaces (drawn by Achmad Sumirat)

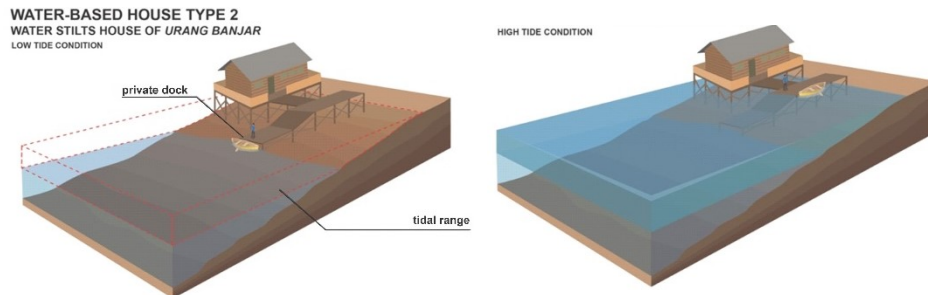


Figure 3. Space zone 2, dry lands (drawn by Achmad Sumirat)

This is in the form of a geometric patterned network resembling a spider's web or considered to be radio-centric with a linearly planned shaft. This design was made by J.J. Meijer in 1880 and the construction was completed by W. Broers in 1890. Moreover, Wijanarka (2008) explained the 5 types of road and canal networks developed by the Dutch East Indies government to include (a) Type 1 which is a One-sided Canal Flanked by Roads, (b) Type 2 which is a One-sided Canal Flanked by Land and Road, (c) Type 3 which is Two canals flanking the road on the outer side of the land, (d) Type 4 which is One side canal flanked by two roads, and (e) Type 5 which is One side canal flanked by two lands. This development is a sign of environmental engineering which is considered an important barometer to adapt the influence of Western technology and at the same time providing resilience to water-based living cultures as indicated in Figure 4.

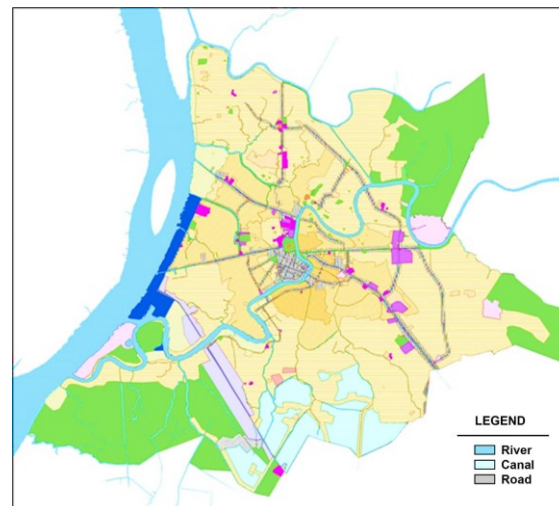


Figure 4. River, Canal and Road Network in Banjarmasin City Structural Planning
(Source: BAPPEDA Kota Banjarmasin, 2009)

The settlement is, however, laid out in a linear form following the direction of the river and it consists of the following sections as described by Kusliansjah (2015).

A) Settlement

1. The floating house (lanting)

Floating houses are called *lanting* because they are floating on the river surface. They usually perform mixed-function of a residence and business place. The collection of *lanting* houses has a cluster pattern and the residents usually use a wooden walkway to land while getting to the boat using the pier. Moreover, the structure is made permanent in one place through the use of post moorings on the riverbank but has the ability to move to another place following the river flow.

2. Stilt houses which are partly above water and partly on land

The first type of stilt house is located on the riverbank and has direct access to the river using the pier and the mainland using a wooden walkway. The floor surface is located above the river water level and the house is constructed to have the ability to adjust to the tidal dynamics of river water. The largest type is the *Bubungan Tinggi* which is generally used for the king's residence. Moreover, the stilt house is usually constructed with due regard for the condition of the natural environment which is dominated by wetlands, mud, and swamps. The stilt house reflects the local wisdom of the community and its adaptation to a water-based environment.

3. Stilt houses located on land

The second type of Stilt house is usually located on land to reflect the balance between the left and the right (*Cacak Burung*). The floor height of this type of house from the ground level is approximately 2 meters. The residential layout reflects the adaptation of residents to activities conducted both on the water and land as observed from the separation of wet and dry areas, dirty and clean rooms, and the reflection of the balance between the left and right (*Cacak Burung*) as shown in Figure 5.



Figure 5. Stilt Houses (source: drawn by Achmad Sumirat)

B) Economic Activity

The strategic position of the city in the lower reaches of the *Barito* river makes it a center of trade and potential international port on the Kalimantan island. The largest trading commodities observed in the area include forest and mining products and trading activities have been identified to be that basic factor for economic growth in the city. The other typical economic activities discovered in the city include traditional markets such as the floating market at the mouth of the *Kuin* river where buying and selling take place on water using boats.

C.) Urban Planning Challenges

The developmental efforts of the New Order government era have changed the face of Banjarmasin city (Subiyakto 2005) and this is majorly due to the fact that economic policies influence urban development. Moreover, infrastructures and transportation facilities are being constructed to distribute oil and mining products at the port with the road between the cities and provinces observed to be prioritized (Subiyakto 2005; Kusno 2000). This is, therefore, encouraging the development of road-oriented settlements due to the easier access and increased mobility between cities and provinces. The increasing use of roads for human mobility and economic activities is gradually reducing the dominance of the river's function as the main transportation network (Subiyakto 2005). Moreover, the continuous investment growth driven by large-scale trade and export-import of mining products involving national and international economic networks requires adequate facilities to support business activities and this is making the settlements along the road to become denser (Andini 2011).

This phenomenon is also contributing to the increase in the city density, thereby, affecting the availability of land to settle and this has led to the non-

consideration of residents' proximity to rivers during residential land expansion. Therefore, several parts of the rivers and canals are being narrowed, thereby, causing the closure of water flow (Andini 2011). Moreover, the shift in the economy and work orientation from agricultural and river-based economies to land-based activities is slowly moving people away from dependence on rivers. This means the significance of rivers in people's lives is decreasing as evident in the reduction in the number of *lanting* and stilt houses. The decentralized system implemented in the country in 2001 has caused changes in governance and development finance and this also led to increasingly influential global economic power challenges to Banjarmasin city (Geenen & Derden 2013). The massive global economy has put pressure on the economy and river-based development such that the urban economy previously dominated by rivers and agriculture has been displaced by an economy based on profit, capital, and land speculation. This pattern has triggered the growth of development and physical projects in the form of property and real-estate development, spreading sporadically on different scales both inside and outside the city without considering the existence of rivers. This means the architecture adopted in these projects generally mimics the modern architecture and this has led to the abandonment of floating and stilt houses partly built above the river level (Cynthia 2018) as shown in Figure 6.



Figure 6. Road-Oriented Settlement Transformation/Land Based due to Urban Planning (bottom) and before (top) (drawn by Yustina)

The regulation of the Minister of Public Works and Public Housing No. 28 of 2015 concerning the safeguarding of rivers and surrounding environment with river boundaries also encourages Banjarmasin City Planning not to place rivers as the main infrastructure to be synergized with water-based settlements. However, the medium- and long-term development agendas which place rivers as the main component of the development program are required to ensure the sustainability of water-based settlements in the future and to avoid the displacement of life based on water and agricultural economy by land-oriented development. The Government Regulation of Indonesia No. 26 of 2008 concerning the National Spatial Plan showed Banjarmasin City as a National Activity Center due to the fact that it is the gateway to areas in the southern part of the Kalimantan island and also developed as a core city in the Metropolitan Area. This, therefore, means the city needs an integrated use of urban space. It is also important to note that the city development is centralized with reference to the Laws and Government Regulations and this has caused an urban planning overlap without considering the environmental context. For example, the obligation to implement the Spatial Planning Law is constrained by the physical conditions as indicated by the domination of the city by water areas. This means attention needs to be placed on these challenges in order to ensure continuous support for the sustainability of water-based settlements in urban development. The observable challenges from the analysis are, therefore, stated as follows:

- a. There is an increasing need for land for settlements in line with population growth.
- b. Urban settlement development tends to be land-based.
- c. Increased transformation of water-based settlements to land-based settlements.
- d. Transformation of land use from agricultural purposes to settlements.
- e. Floating and stilt houses are increasingly marginalized and are less attractive to the public.
- f. The implementation of the river boundaries policy is limiting the development of floating or lanting and stilt houses.
- g. The distance between buildings along the river banks tends to be tighter and observed to be blocking the viewpoint to the river.

The conditions of the rivers and canals are also described as follows:

- a. The river water becomes brackish and salty in the dry season due to seawater intrusion.
- b. There is river degradation, high silt sedimentation, and riverbank erosion.
- c. The river space has turned into a backyard and the reduction of water-based settlements is decreasing the quality of urban rivers due to the changes in their function.

- d. The width of most of the rivers, especially *Martapura*, *Alalak*, *Kuin*, has been narrowed by buildings and public facilities.

CONCLUSION

The conclusions from the analysis are stated as follows:

- a) The formation of an environmental structure as a form of residents' adaptation to the water area has existed before the colonial era and this is indicated by the familiar water culture among the people of Banjarmasin.
- b) The modernization during the colonial era created a combination of local and Western technology in the Banjarmasin city development
- c) The development orientation towards land started since the city experienced centralized development in the New Order era up to the present time and it was triggered by the growth of modern industry and trade which replaced agriculture.
- d) The city development has focused more on river balance by applying river boundaries since the enactment of the Spatial Planning Law.
- e) The river forms the structure of the city and water-based architecture characterizes the building pattern of the water or waterfront city.
- f) A floating house has the potential to be developed based on the fact that it is a product of the adaptation and resilient settlement architecture in the water area. It was also observed that the existence of floating and stilt houses supports the uniqueness of the waterfront city.
- g) The river spatial development policies need to explore the adaptation and resilience of river settlements as a local brand identity for the city. This means the development of human life civilization and the challenges of changing the river environment ecosystem require the need for regulatory systems and technological innovations which are able to provide resilience in the water-based settlement.
- h) The floating building is expected to be a solution for future development due to its ability not to damage the ecosystem. The architecture can be also developed into floating settlements and cities as a long-term technological innovation to solve urban environmental problems based on water.
- i) The importance of controlling the spatial and cultural transformation of water-based settlements in urban development is to maintain resilience for future generations.
- j) The development of civilization in human life and changes in the water-based environmental ecosystem in the Banjarmasin city in the present era has encouraged the need for water-based settlements to become city assets or heritage which are preserved as the brand identity.
- k) The concept of "living with water" is a technological innovation challenge for water settlements which reflects a strategy in water spatial planning and development of water-based cultural adaptation.

- 1) Urban planning in Banjarmasin City, which tends to prioritize road construction, has led to the rapid transformation of residential areas from river to land-oriented. This phenomenon causes a change in the culture of life, from a water-based to a road/land- culture.

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